

# Crestron C2N-RTHS

## Temperature and Humidity Sensor, Cresnet®

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### Operations & Installation Guide



This document was prepared and written by the Technical Documentation department at:



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### Regulatory Compliance

As of the date of manufacture, the C2N-RTHS has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.



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### Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions:

(1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION:** Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

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### Industry Canada (IC) Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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# Contents

<b>Temperature and Humidity Sensor, Cresnet: C2N-RTHS</b>	<b>1</b>
Introduction .....	1
Features and Functions .....	1
Specifications .....	2
Physical Description .....	3
Setup .....	5
Network Wiring .....	5
Identity Code .....	5
Installation .....	6
Hardware Hookup .....	7
Programming Software .....	8
Earliest Version Software Requirements for the PC .....	8
Programming with Crestron SystemBuilder .....	8
Programming with D3 Pro .....	9
Programming with SIMPL Windows .....	9
Uploading and Upgrading .....	12
Establishing Communication .....	12
Programs and Firmware .....	13
Program Checks .....	13
Problem Solving .....	14
Troubleshooting .....	14
Check Network Wiring .....	14
Reference Documents .....	16
Further Inquiries .....	16
Future Updates .....	16
Return and Warranty Policies .....	17
Merchandise Returns / Repair Service .....	17
CRESTRON Limited Warranty .....	17



# Temperature and Humidity Sensor, Cresnet: C2N-RTHS

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## Introduction

The C2N-RTHS is a wall-mounted temperature and relative humidity sensor that communicates directly with any 2-Series control system via the Cresnet® control network. One-piece mounting makes the C2N-RTHS simple to install. The 1-1/2 inch (39 mm) diameter face protrudes just 1/8 inch (3 mm) from the wall surface and is easily painted or wallpapered to blend into the wall surface.

## Features and Functions

- Small and unobtrusive face allows blending into any decor
- Primed white, may be used as is, painted, or wallpapered
- Easy one-piece mounting (additional hardware not required)
- Readily connects to Cresnet with four wire pigtail (four wire nuts included)
- Touch Settable ID (TSID) capable

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**NOTE:** The C2N-RTHS is not to be used in conjunction with the CHV-TSTAT or the CHV-THSTAT. The C2N-RTHS is a Cresnet network device.

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## Specifications

Specifications for the C2N-RTHS are listed in the following table.

### *C2N-RTHS Specifications*

SPECIFICATION	DETAILS
Measurement Range	
Temperature	-40° to 176° F (-40° to 80° C)
Humidity	0% to 100% RH
Temperature Output Resolution	0.1° F (0.1° C)
Humidity Output Resolution	1% RH
Temperature Accuracy	
Over Full Range	±0.9° F (0.5° C)
At Room Temperature	+0.2 / -0.7° F (+0.1 / -0.4° C)
Humidity Accuracy	±5%
Connection	~10 inch (~254 mm) 4-wire pigtail; Connects to Cresnet control network
Power	
Cresnet Power Usage	0.25 Watts (0.01 Amps @ 24 Volts DC)
Default Net ID	2B
Minimum 2-Series Control System Update File <sup>1, 2, 3</sup>	Version 2.004 or later
Enclosure	Cylindrical plastic, drywall mountable in a 1 in (~26 mm) diameter round hole; Primed metal cap suitable for paint or wallpaper
Dimensions	
Diameter	1.50 in (39 mm)
Depth	2.22 in (57 mm)

1. The latest software versions can be obtained from the Crestron® Web site. Refer to the NOTE following these footnotes.
2. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.
3. When loading VT Pro-e® files or firmware through the RS-232 port of the control system, be sure that the baud rate is at 38400 (Cresnet speed) or lower. Otherwise, Toolbox may post the “Transfer Failed” message.

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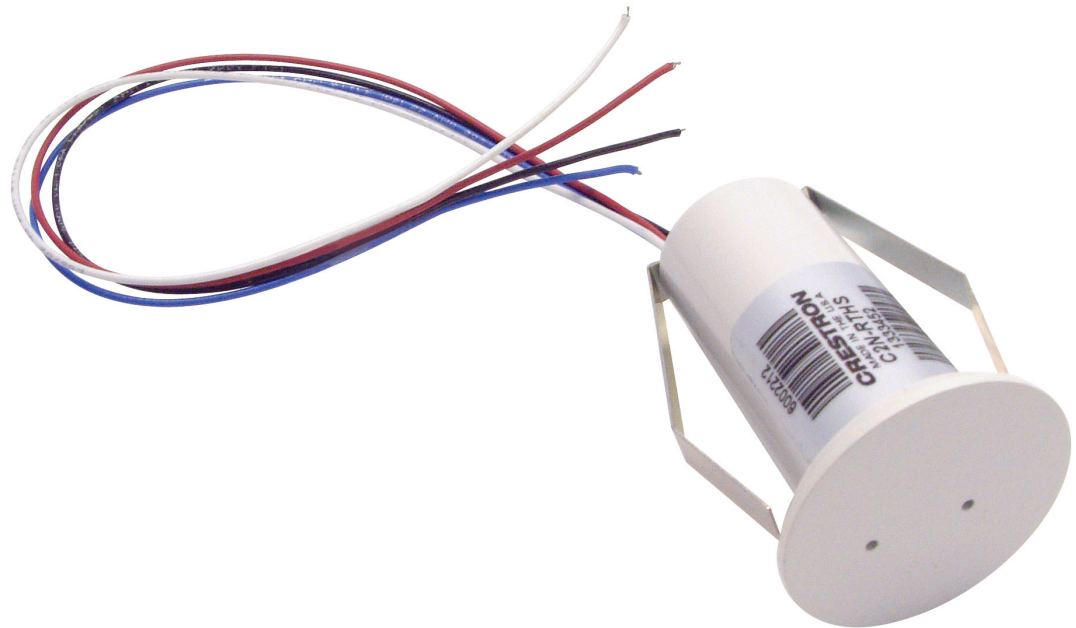
**NOTE:** Crestron software and any files on the website are for Authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

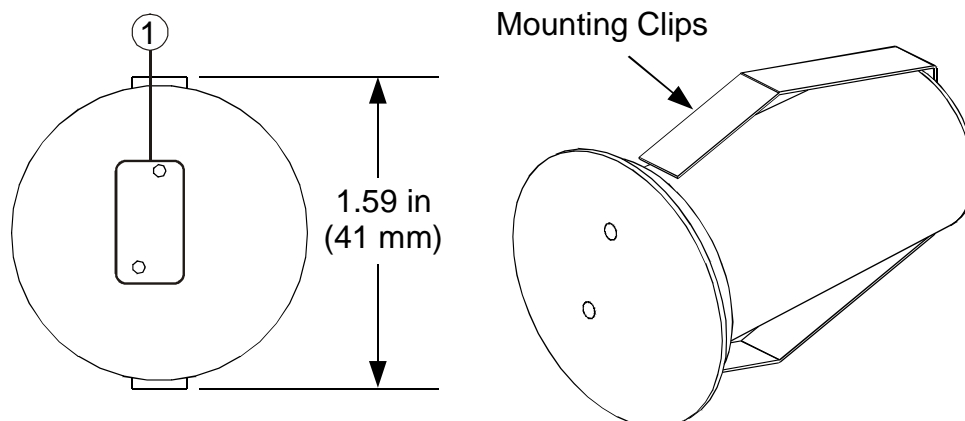
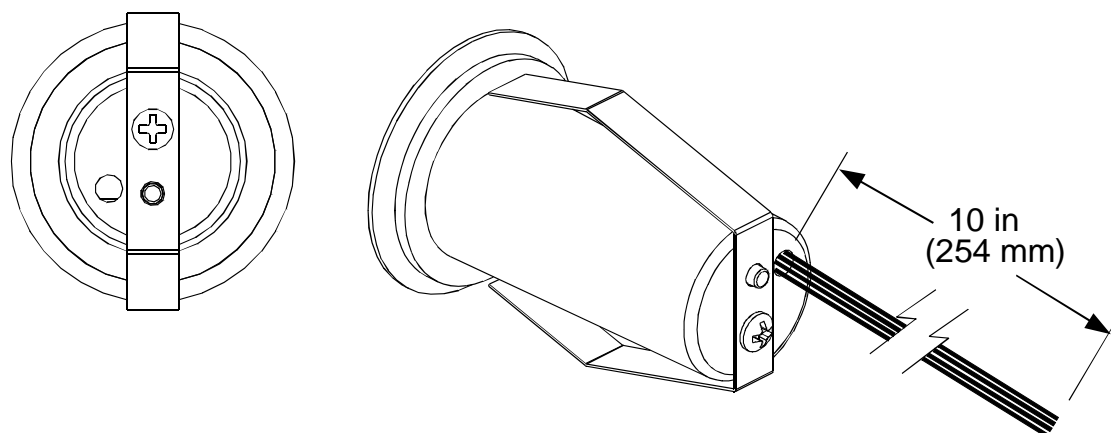
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## Physical Description

This section provides information on the connections, controls and indicators available on your C2N-RTHS.

### *C2N-RTHS Physical View*



***C2N-RTHS Overall Dimensions (Front and Angled Views)******C2N-RTHS Overall Dimensions (Rear and Angled Views)******Connectors, Controls & Indicators***

#	CONNECTORS, CONTROLS & INDICATORS	DESCRIPTION
1	Setup Button and LED	(1) Miniature pushbutton and red LED, used for setting network ID during initial configuration or when the device is being added/replaced. Also used for touch-settable ID (TSID).

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## Setup

### Network Wiring

When wiring the Cresnet network, consider the following:

- Use Crestron Certified Wire.
- Use Crestron power supplies for Crestron equipment.
- Provide sufficient power to the system.

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**CAUTION:** Insufficient power can lead to unpredictable results or damage to the equipment. Use the Crestron Power Calculator to help calculate how much power is needed for the system ([www.crestron.com/calculators](http://www.crestron.com/calculators)).

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For networks with 20 or more devices, use a Cresnet Hub/Repeater (CNXHUB) to maintain signal quality.

For more details, refer to “Check Network Wiring” which starts on page 14.

### Identity Code

The Net ID of the C2N-RTHS has been factory set to **2B**. The Net IDs of multiple C2N-RTHS devices in the same system must be unique. Net IDs are changed from a personal computer (PC) via Crestron Toolbox™ (refer to “Establishing Communication” on page 12).

When setting the Net ID, consider the following:

- The Net ID of each unit must match an ID code specified in the SIMPL™ Windows program.
- Each network device must have a unique Net ID.

For more details, refer to the Crestron Toolbox help file.

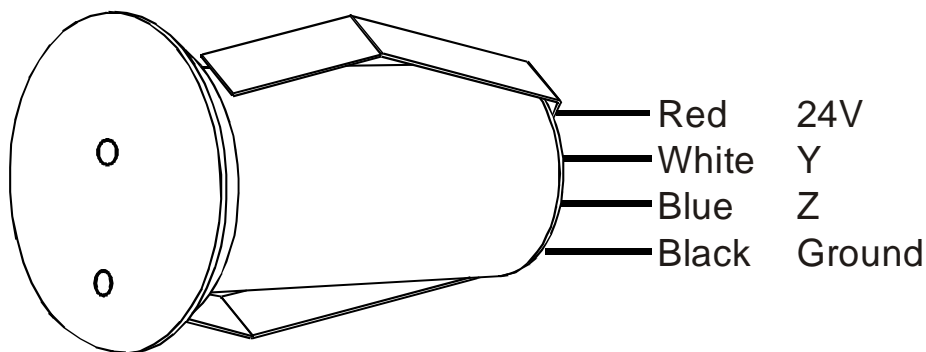
## Installation

**NOTE:** Ensure the location is not close to a heat or humidity source and is away from direct sunlight, skylights, and windows. When mounting the sensor outdoors, do not place in direct sunlight, and do not place where the sensor will be directly exposed to precipitation. Sensors are suitable for mounting in dry or damp locations as defined by the National Electrical Code.

Complete the following procedure to install the C2N-RTHS:

1. Locate an area on the wall that is free of miscellaneous wiring and studs.
2. Make a small hole near the center of the designated mounting site to verify that the location is suitable.
3. Drill or cut a 1 in (26 mm) diameter circular hole in the wall at the desired position.
4. Route the Cresnet wires to the sensor. Use the four wire nuts included to connect the wires (red to red, white to white, blue to blue, and black to black).

### *Cresnet Wiring for the C2N-RTHS*



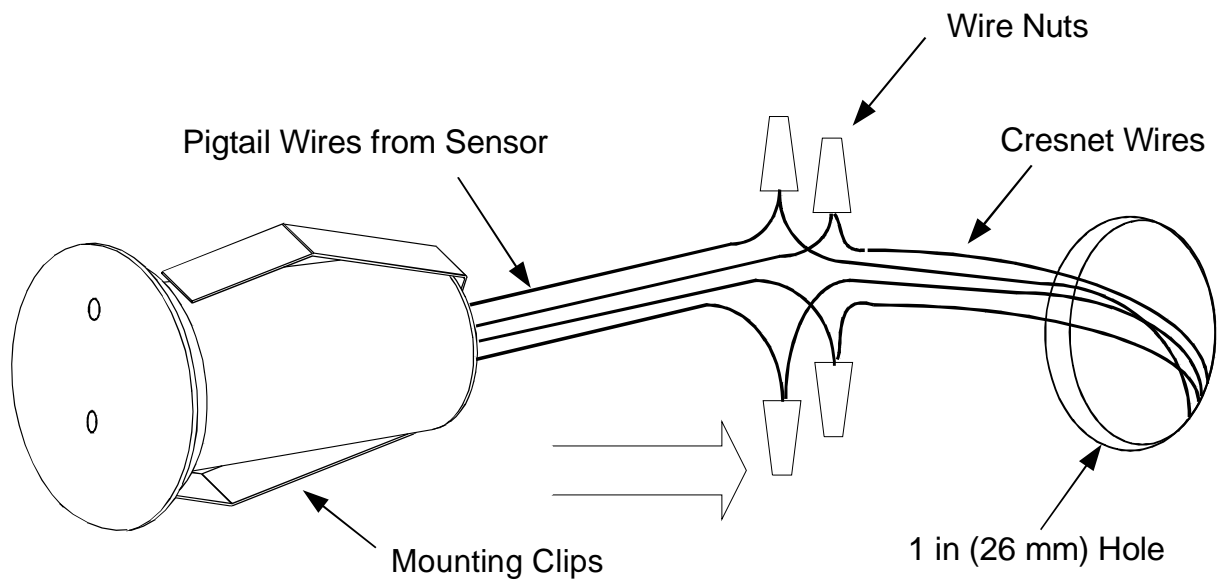
5. Press fit the sensor into the hole; the clips on either side of the sensor hold it in place.

**NOTE:** The face of the sensor may be painted or wallpapered to match the wall. Ensure that paint does not enter (or wall paper cover) the perimeter gap or the holes for the Setup button and LED.

## Hardware Hookup

Make the necessary connections as called out in the illustration that follows this paragraph. Refer to “Network Wiring” on page 5 before attaching the Cresnet wires to the sensor. Apply power after all connections have been made.

### *Wiring the C2N-RTHS*



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## Programming Software

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### Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron Web site. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at [www.crestron.com/support](http://www.crestron.com/support). First-time users will need to establish a user account.

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### Earliest Version Software Requirements for the PC

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**NOTE:** Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron Web site ([www.crestron.com/software](http://www.crestron.com/software)).

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Crestron provides an assortment of Windows®-based software tools to develop a customized system. Use Crestron SystemBuilder™, D3 Pro® or SIMPL Windows to create a program to control the C2N-RTHS. Customers whose focus is on lighting systems may prefer to use the D3 Pro software since it is designed especially for creating lighting and environmental system control applications. Customers already familiar with SIMPL Windows who are including a lighting system as part of an overall control system project may prefer to continue using SIMPL Windows.

### Programming with Crestron SystemBuilder

Crestron SystemBuilder is the easiest method of programming but does not offer as much flexibility as SIMPL Windows. For additional details, download SystemBuilder from the Crestron Web site and examine the extensive help file.

## Programming with D3 Pro

Crestron's D3 Pro lighting software provides all the tools necessary to create a complete Crestron lighting system for residential applications. The lighting system includes the control system logic program, touchpanel projects and keypad programming, documentation and real-time lighting adjustment capabilities.

As with all Crestron software, D3 Pro provides extensive right-click and drag-and-drop functionality in addition to convenient keyboard shortcuts for frequently used functions and commands.

Programming is organized into six system **Views** of the lighting system, each providing a moveable toolbox of devices such as interfaces, fixtures and control modules. You can add a device to your system simply by selecting it from one of the toolboxes and dragging it to a room. The available toolboxes differ depending on the View but all Views include a "General" toolbox that allows you to add areas and rooms at any time.

## Programming with SIMPL Windows

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**NOTE:** While SIMPL Windows can be used to program the C2N-RTHS, it is recommended to use SystemBuilder for configuring a system.

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SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers": Configuration and Program.

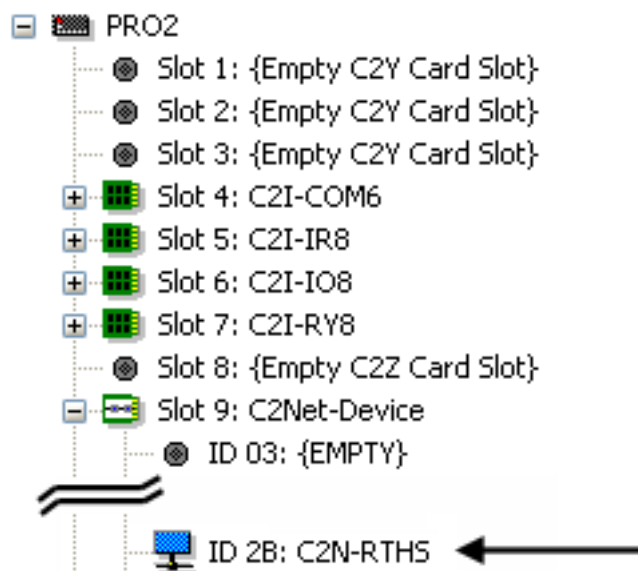
### Configuration Manager

Configuration Manager is the view where programmers "build" a Crestron control system by selecting hardware from the *Device Library*.

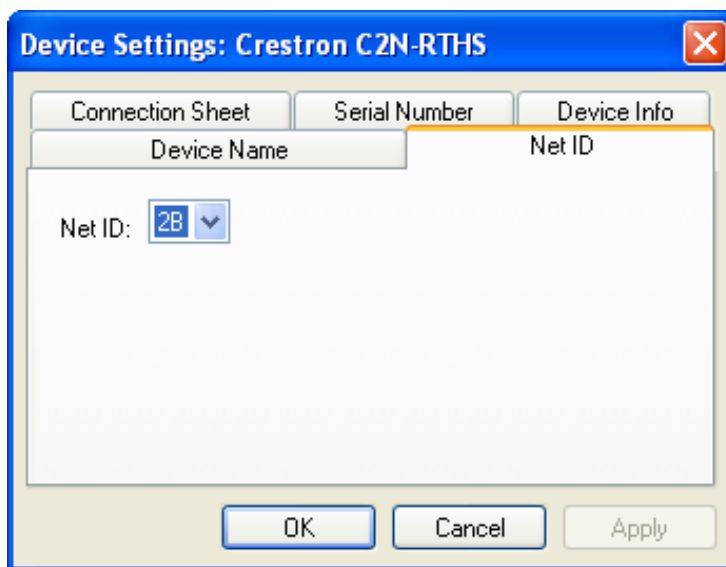
1. To incorporate the C2N-RTHS into the system, drag the C2N-RTHS from the Cresnet Control Modules folder of the *Device Library* and drop it in the *System Views*.

*Locating the C2N-RTHS in the Device Library*

The system tree of the control system displays the device in the appropriate slot with a default Net ID as shown in the following illustration.

*C2Net Device, Slot 9*

- If additional C2N-RTHS devices are to be added, repeat step 1 for each device. Each C2N-RTHS is assigned a different Net ID number as it is added.
- If necessary, double click a device to open the “Device Settings” window and change the Net ID, as shown in the following illustration.

***“Device Settings: Crestron C2N-RTHS” Window***

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**NOTE:** The ID code specified in the SIMPL Windows program must match the Net ID of each unit. Refer to “Identity Code” on page 5.

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***Program Manager***

Program Manager is the view where programmers “program” a Crestron control system by assigning signals to symbols.

The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (**F1**).

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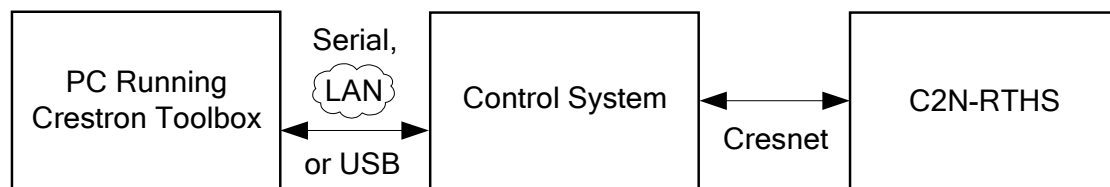
## Uploading and Upgrading

Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs, or firmware) can be transferred to the control system (and/or device). Finally, program checks can be performed (such as changing the device ID or creating an IP table) to ensure proper functioning.


### Establishing Communication

Use Crestron Toolbox for communicating with the C2N-RTHS; refer to the Crestron Toolbox help file for details. There is a single method of communication: indirect.

#### *Indirect Communication*



The C2N-RTHS connects to control system via Cresnet:

1. Establish communication between the PC and the control system as described in the latest version of the 2-Series Control Systems Reference Guide (Doc. 6256).
2. Use the Address Book in Crestron Toolbox to create an entry for the C2N-RTHS using the expected communication protocol (indirect). Select the Cresnet ID of the C2N-RTHS and the address book entry of the control system that is connected to the C2N-RTHS.
3. Display the C2N-RTHS's "System Info" window (click the  icon); communications are confirmed when the device information is displayed.

## Programs and Firmware

Program or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron Web site as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file or the Crestron Toolbox help file.

### *SIMPL Windows*

If a SIMPL Windows program is provided, it can be uploaded to the control system using SIMPL Windows or Crestron Toolbox.

### *Firmware*

Check the Crestron Web site to find the latest firmware. (New users may be required to register to obtain access to certain areas of the site, including the FTP site.)

Upgrade C2N-RTHS firmware via Crestron Toolbox.

1. Establish communication with the C2N-RTHS and display the “System Info” window.
2. Select **Functions | Firmware...** to upgrade the C2N-RTHS firmware.

## Program Checks

Using Crestron Toolbox, display the network device tree (**Tools | Network Device Tree View**) to show all network devices connected to the control system. Right-click on the C2N-RTHS to display actions that can be performed on the C2N-RTHS.

## Problem Solving

### Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

#### *C2N-RTHS Troubleshooting*

TROUBLE	PROBABLE CAUSE(S)	CORRECTIVE ACTION
No temperature or humidity reading.	Wiring not properly connected.	Check connection, refer to “Hardware Hookup” on page 7.
	Improper Cresnet ID.	Check Cresnet ID, refer to “Identity Code” on page 5.
	Improper programming.	Check SIMPL Windows program, refer to “Programming with SIMPL Windows” which starts on page 9.

### Check Network Wiring

#### *Use the Right Wire*

To ensure optimum performance over the full range of your installation topology, use Crestron Certified Wire only. Failure to do so may incur additional charges if support is required to identify performance deficiencies because of using improper wire.

#### *Calculate Power*

**CAUTION:** Use only Crestron power supplies for Crestron equipment. Failure to do so could cause equipment damage or void the Crestron warranty.

**CAUTION:** Provide sufficient power to the system. Insufficient power can lead to unpredictable results or damage to the equipment. Use the Crestron Power Calculator to help calculate how much power is needed for the system ([www.crestron.com/calculators](http://www.crestron.com/calculators)).

When calculating the length of wire for a particular Cresnet run, the wire gauge and the Cresnet power usage of each network unit to be connected must be taken into consideration. Use Crestron Certified Wire only. If Cresnet units are to be daisy chained on the run, the Cresnet power usage of each network unit to be daisy chained must be added together to determine the Cresnet power usage of the entire chain. If the unit is run from a Crestron system power supply network port, the Cresnet power usage of that unit is the Cresnet power usage of the entire run. The wire gauge and the Cresnet power usage of the run should be used in the following equation to calculate the cable length value on the equation's left side.

### ***Cable Length Equation***

$$L < \frac{40,000}{R \times P}$$

Where: L = Length of run (or chain) in feet

R = 6 Ohms (Crestron Certified Wire: 18 AWG (0.75 mm<sup>2</sup>))  
or 1.6 Ohms (Cresnet HP: 12 AWG (4 mm<sup>2</sup>))

P = Cresnet power usage of entire run (or chain)

Make sure the cable length value is less than the value calculated on the right side of the equation. For example, a Cresnet run using 18 AWG Crestron Certified Wire and drawing 20 watts should not have a length of run more than 333 feet (101 meters). If Cresnet HP is used for the same run, its length could extend to 1250 feet (381 meters).

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**NOTE:** All Crestron certified Cresnet wiring must consist of two twisted pairs. One twisted pair is the +24V conductor and the GND conductor and the other twisted pair is the Y conductor and the Z conductor.

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### ***Strip and Tin Wire***

When daisy chaining Cresnet units, strip the ends of the wires carefully to avoid nicking the conductors. Twist together the ends of the wires that share a pin on the network connector and tin the twisted connection. Apply solder only to the ends of the twisted wires. Avoid tinning too far up the wires or the end becomes brittle. Insert the tinned connection into the Cresnet connector and tighten the retaining screw. Repeat the procedure for the other three conductors.

### ***Add Hubs***

Use of a Cresnet Hub/Repeater (CNXHUB) is advised whenever the number of Cresnet devices on a network exceeds 20 or when the combined total length of Cresnet cable exceeds 3000 feet (914 meters).

## Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron Web site ([www.crestron.com/manuals](http://www.crestron.com/manuals)).

### *List of Related Reference Documents*

DOCUMENT TITLE
2-Series Control Systems Reference Guide

## Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling Crestron at 1-888-CRESTRON [1-888-273-7876]. For assistance in your region, please refer to the Crestron Web site ([www.crestron.com](http://www.crestron.com)) for a listing of Crestron worldwide offices.

You can also log onto the online help section of the Crestron Web site ([www.crestron.com/onlinehelp](http://www.crestron.com/onlinehelp)) to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

## Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the C2N-RTHS, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron Web site periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

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## Return and Warranty Policies

### Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange or service without prior authorization from CRESTRON. To obtain warranty service for CRESTRON products, contact an authorized CRESTRON dealer. Only authorized CRESTRON dealers may contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number and return address.
2. Products may be returned for credit, exchange or service with a CRESTRON Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to CRESTRON, 6 Volvo Drive, Rockleigh, N.J. or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. CRESTRON reserves the right in its sole and absolute discretion to charge a 15% restocking fee plus shipping costs on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by CRESTRON, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

### CRESTRON Limited Warranty

CRESTRON ELECTRONICS, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from CRESTRON, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touchscreen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from CRESTRON or an authorized CRESTRON dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

CRESTRON shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended or if it has been subjected to misuse, accidental damage, modification or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall CRESTRON be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. CRESTRON is not liable for any claim made by a third party or made by the purchaser for a third party.

CRESTRON shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, CRESTRON makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.

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04.11**

Specifications subject to  
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